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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/628,828	07/31/2000	Luca Rigazio	9432-000116	5141

7590 01/29/2004

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EXAMINER	
HAN, QI	

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 01/29/2004

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/628,828	RIGAZIO ET AL.	
	Examiner	Art Unit	
	Qi Han	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Amendment

2. This communication is responsive to the applicant's amendment dated 12/16/2003 (Paper 5). Applicant amended claims 1, 10, 16, 17 and 19 (see paper 5, pages 3-7) and cancelled claim 5.

3. Examiner withdraws the disclosure objection (e), because applicant made amendment and/or correction (paper 6).

Response to Arguments

4. Applicant's arguments with respect to claims 1-4 and 6-20 have been considered but they are not persuasive.

5. Regarding disclosure objection (a), even though applicant made certain amendment and/or correction (see paper 5, page 2), the equitation is still not clearly and/or completely defined. The objection will be sustained (see following objection).

6. Regarding disclosure objection (b) and (c), even though applicant made certain amendment and/or correction (see paper 5, page 2), the related portion of specification and

drawing are still not clearly defined or described. In addition, applicant fails to response examiner's suggestion to show/explain how the traversal algorithm works by using the tree on the right side of the Fig 2. The objection will be sustained (see following objection).

7. Regarding claim 1 objection, even though applicant made certain amendment and/or correction (see paper 5, page 2) and explanation (paper 5, pages 11-12), the claim still remains contradiction and/or vagueness between the claimed limitation and the portion of the specification. In addition, applicant fails to response all issues raised by examiner. The objection will be sustained (see following objection).

8. Regarding claim rejection under 35 U.S.C 103(a):

In response to applicant's argument regarding claim 1 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "active node envelopes", see paper 5, page 13, paragraph 1) are not recited in the rejected claim 1. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response applicant's arguments (regarding claim 1) that in the prior art lacks disclosing amended limitation of "**at least two node of a give generation** are processed ..."(paper 5, page 13, paragraphs 2-3), it is reminded that applicant introduced a new subject matter "**at least two node of a give generation**", which was not disclosed in the original specification. In addition,

the claim involves certain contradiction and/or vagueness issue(s) of the traversal algorithm, see details in the disclosure and claim objections below.

In response applicant's arguments (regarding claim 10) that "there is nothing in Kao or Mitchell to show that it is an active envelope that is propagated by a set of rules" and "Kao and Mitchell cannot be combined to render claim 10 as obvious because neither of them suggest an active envelope and a mechanism that uses a set of rules to propagate the active envelope" (paper 5, page 14, paragraph 4), the examiner respectfully disagrees applicant and has a different of view of the prior art teachings and claim interpretations, see detail explanation in the claim rejection of this office action below. Further, it is noted that any traversal algorithm must include a set of rules, which is inherent nature of a traversal algorithm. In addition, claimed limitation of "a set of traversal rule" involves certain contradiction and/or vagueness issue(s) of the traversal algorithm in the specification, see detail in the disclosure objection c. below.

Specification and Drawing

9. The disclosure is objected to because of the following:

a. On page 12, lines 20-22 (also see amendment: paper 5, page 2), the equation is not clearly defined, because there is only one expression item in the function of max { } and variables $a_{\varphi,k}$ is not clearly defined or described (such as meaning of it and/or role in the equitation). Appropriate correction is required.

b. On page 14, lines 1-8 (also see amendment: paper 5, pages 2 and 9-10), the description appears to show certain relationship between Fig. 2 and Figure 4b, however the two figures appear to show different types of trees, since Fig. 4b has no edge between the nodes in

the same level. Further, in Fig. 2, left side of the memory structure does not match the corresponding right side of tree structure (comparing lower half of both structures). Furthermore, it appears to be incorrect for the path of word "hart" on the right tree of Fig. 2. Appropriate correction on specification and/or drawing is required.

c. On page 14, lines 10-18 (also see amendment: paper 5, pages 2 and 10-11), even though applicant made amendment (paper 5, pages 2), the algorithm is still not clearly defined. For example, at steps 1, the algorithm proceeds "start from the deepest active list in the lexical tree" (also see right most column of Fig. 4b), at this point, there is no child, so that step 4 cannot process. Further example, step 2 defines B being a "ranked node" and step 4 says c is another node (child of the current node), thus, the compressions at steps 5-7 lack clearly meaning (comparing index, transition probabilities, or score?). Appropriate correction is required. In addition, examiner suggests that applicant explains/shows how the traversal algorithm works by using the tree on the right side of Fig. 2, as an example.

d. According to page 17, lines 9-22, the trees 74 and 76 in Fig. 4a should be same as tree 70 for consistence, but they are not. Further, tree 70 is even not a tree at all. Appropriate correction is required.

Concerning multiple errors found in the application as stated above, it is reminded that it is applicant's responsibility to make clear description of the subject matter in the application and correct any errors of which applicant may become aware in the application. It is also remained that there is no new subject matter allowed.

Claim Objections

10. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Regarding claim 1,

a. the limitation of "at least two notes of a given generation are processed before the parent nodes of said given generation are processed" and "the deepest child generation is processed first" are contradictory to certain part of the specification (page 18, line 17 through page 22, line16), which suggests the search algorithm starts from root to leaves. The claimed limitation(s), at least, does not clearly distinct and/or specify the two different situations. Moreover, the limitation of "the deepest child generation is processed first" appears to be not common approach of conventional traversal algorithms in the art, it must be clearly described, also, its required condition(s) must be given. Otherwise, for example, traversing the tree shown in Fig. 2 for searching word "car", it doesn't make sense that "the deepest child generation is processed first", because it is not necessary to go the deepest child (level 5 in this case) in a tree for the traversal. Furthermore, since applicant suggests the traversal does not starts from the root node, how to determining a start point should be disclosed, but applicant fails to do so, which may cause enablement problem. Applicant is required to explain how the traversal algorithm works, by taking a simple example, such as searching word "car", using the tree structure on the right side of Fig. 2, in order to make the traversal algorithm much more understandable.

b. since the specification does not clearly define the traversal algorithm (see the disclosure objection c. above), the limitation of "a set of traversal rules" will be interpreted as any set of traversal rules, as best understood in view of the disclosure objection above.

Regarding claim 10, the objection is based on the same reason described in the claim1 objection b. above.

Regarding claim 6, since amendment (paper 5, page 4) canceled claim 5, it appears that the claim 6 depends on claim 1 and will be treated as so, hereinafter.

Claim Rejections - 35 USC § 112

11. Claim 1 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 1, the amended limitation of "at least two nodes of a given generation are processed before the parent nodes of said given generation are processed, ..." is new subject matter, which was not described in the original specification.

Claim Rejections - 35 USC § 103

12. Claims 1, 3 and 6 -16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao (USPN 6,374,222 B1), in view of Mitchell et al. (USPN 6,574,595), hereinafter referenced as Mitchell.

As per **claim 1**, as best understood in view of claim objection (see above), Kao discloses a method of memory management in speech recognition, for reducing the size of memory required in speech recognition searching (abstract), comprising:

a tree data structure implemented in a computer-readable memory accessible by a processor, said tree data structure having a plurality of nodes that topologically define a root node and a plurality of parent-child generations, including a deepest child generation that is topologically furthest from the root (column 3, lines 2-5 and Fig. 1, 'computer/comparator 10b' and 'memory10c'; column 6, line 37, 'digital signal processor'; column 2, line 40 and column 8, line 9, 'search tree' and 'node' equivalent to 'slot', also see Fig. 5);

a traversal algorithm implemented by said processor , said algorithm traversing said nodes based on a set of traversal rules, (column 6, lines 37-38, 'Digital Signal Processor implementation'; column 4, lines 1-67 and column 9, lines 10-45, 'a structure called slot (herein equivalent to node)' and 'search algorithm', including the fields of indexes and pointers and the algorithm related requirement, grammar, timing and condition (herein broadly interpreted as a set of traversal rules); and column 5, lines 61-67 and Fig.4, 'traverse down the search space'), "whereby at least two nodes of a given generation are processed before the parent nodes of said given generation are processed" and "traversal among nodes of each generation proceeds in the same topological direction", (column 4, lines 58-60, 'propagate the current time stamp backward through the whole path (a path is a backward linked list of slots)', which suggests that a child generation is processed before its parent node with a backward direction; and Fig. 3 and Fig. 5 shows that there are at least two notes at the leave level of the tree).

a mechanism for designating selected ones of said nodes as active nodes, wherein said active nodes having a probability score above a pre-determined search threshold, (column 4, lines 64-67, 'active state (herein equivalent to active node)'; column 3, lines 9-11, 'HMM' with 'states and transitions'; and column 5, lines 64-65, 'the acoustic score and the transition score are accumulated'; which suggests using probability score).

But, Kao does not expressly disclose that during the traversal algorithm "the deepest child generation is processed first", and the probability score stated above is "above a pre-determined search threshold". However, this feature was well know in the art as evidenced by Mitchell, who discloses a beam search algorithm (herein equivalently interpreted as to traversal algorithm) with a linked list known as the decoding tree (column 3, line 52 to column 4 line 6). Mitchell further teaches that at end of the spoken utterance (herein corresponding to the deepest child generation in the process), the best scoring ending phoneme is used to retrieve the most likely phoneme sequence by traversing through the list of corresponding pointer entries in the decoding tree and this process is commonly referred to as backtracking (column 4, lines 6-11). Moreover, Mitchell discloses each node corresponds with a particular active phoneme of the phone network (column 4, lines 2-6) and the beam searching algorithm under the constraints (herein interpreted as a set of rules, including removing those phonemes that likelihood score lower than a prescribed value (a pre-determined search threshold)(column 3, lines 44-65). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao by specifically providing a backtracking approach for traversing through the list and using a pre-determined threshold for searching, as taught by Mitchell, for the purpose of obtaining a global best path (Mitchell: column 4, line 52) for a speech recognition system.

As per **claim 3**, Kao and Mitchell disclose everything claimed, as applied above (see claim 1). Kao in view of Mitchell further teaches that said tree data structure is encoded in said memory with parent-child generations being represented through linked list, (Kao: column 2, line 4 and column 4, line 60; and column 4, lines 12-24, 'slot (node)' 'structure', also see Fig. 5).

As per **claim 6**, Kao and Mitchell disclose everything claimed, as applied above (see claim 1). Kao in view of Mitchell defines a slot (note) structure for the search network (Kao: column 4, lines 7-20 and column 9, lines 10-18), and the list of "viable" phoneme sequences is updated and stored as a linked list (herein interpreted as active envelope data structure) also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (Mitchell: column 4, lines 2-6), which corresponds to the claimed "said mechanism for designating selected ones of said nodes as active nodes comprises an active envelope data structure associated with said tree data structure."

As per **claim 7**, Kao and Mitchell disclose everything claimed, as applied above (see claim 1). Kao in view of Mitchell further a mechanism for designating selected ones of said nodes as active nodes (Kao: column 3, lines 55-59, 'lexicon HMM' and 'active state (herein equivalent to active node)'); and wherein said traversal algorithm includes a traversal rules whereby only said active nodes are traversed, (Mitchell: column 3, lines 52-53, 'a beam search algorithm (herein equivalently interpreted as to traversal algorithm) only searches the active portion of the phone network'; column 4, lines 2-6, 'the list of "viable" phoneme sequences is updated and stored as a linked list also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network').

As per **claim 8**, Kao and Mitchell disclose everything claimed, as applied above (see claim 1). Kao in view of Mitchell further discloses said tree data structure is a lexical tree representing a lexicon (column 2, lines 1-26, 'lexical tree', 'pronunciation grammar'; and column 3, lines 55-59 'lexicon HMM').

As per **claim 9**, Kao and Mitchell disclose everything claimed, as applied above (see claim 1). Kao in view of Mitchell further discloses said tree data structure is a lexical tree representing the lexicon of a speech recognizer (column 2, lines 1-26, 'lexical tree', 'pronunciation grammar'; and column 3, lines 32-59, 'a speech recognition system (equivalent to speech recognizer)', 'lexicon HMM').

As per **claim 10**, as best understood in view of claim objection (see above), Kao discloses a method of memory management in speech recognition, for reducing the size of memory required in speech recognition searching (abstract), comprising:

a tree data structure implemented in a computer-readable memory accessible by a processor, said tree data structure having plurality of nodes (column 3, lines 2-5 and Fig. 1, 'computer (inherent include processor)/comparator 10b' and 'memory10c'; column 2, line 40 and column 8, line 9, 'search tree' and 'node' equivalent to 'slot', also see Fig. 5);

a mechanism for designating selected ones of said nodes as active nodes, said mechanism for designating selected ones of said nodes as active nodes defines an active envelope and uses a set of rule to propagate the active envelope, (column 1, line 47 'Verterbi bean search' and column 7, line 40, 'the search beam width'; column 4, lines 10-20 and 55-59, 'active state (herein equivalent to active node)', 'many states can be active and need to be evaluated, they are

linked together by next_state (pointer)' herein the linked active states is interpreted as active envelope, 'propagate the current time stamp backward through the whole path'); and

a traversal algorithm implemented by said processor, said algorithm traversing said nodes based on a set of traversal rules (column 6, lines 37-38, 'Digital Signal Processor implementation'; column 5, lines 61-67 and Fig.4, 'traverse down the search space'; column 4, lines 1-67, 'defining the computer data structure and implementing the algorithm', 'search algorithm').

But, Kao does not expressly disclose that during the traversal "only said active nodes are traversed". However, this feature was well know in the art as evidenced by Mitchell, who discloses that a beam search algorithm (herein equivalently interpreted as to traversal algorithm) only searches the active portion of the phone network (column 3, lines 52-53), and the list of "viable" phoneme sequences is updated and stored as a linked list also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (column 4, lines 2-6). Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao by specifically using beam search algorithm for traversing only active nodes (equivalent to active states) of the tree structure, as taught by Mitchell, for the purpose of reducing search complexity (Mitchell: column 3, lines 53-54) for a speech recognition system.

As per **claim 11**, Kao and Mitchell disclose everything claimed, as applied above (see claim 10). Kao in view of Mitchell defines a slot (note) structure for the search network (Kao: column 4, lines 7-20 and column 9, lines 10-18), and the list of "viable" phoneme sequences is updated and stored as a linked list (herein interpreted as active envelope data structure) also

known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (Mitchell: column 4, lines 2-6), which corresponds to the claimed "said mechanism for designating selected ones of said nodes as active nodes comprises an active envelope data structure associated with said tree data structure."

As per **claim 12**, Kao and Mitchell disclose everything claimed, as applied above (see claim 10). Kao in view of Mitchell further discloses that said traversal algorithm includes a dynamic programming process that assigns a likelihood score to nodes that are traversed (Mitchell: column 3, lines 41-53, 'highest likelihood score' and 'dynamic programming using Viterbi algorithm').

As per **claim 13**, Kao and Mitchell disclose everything claimed, as applied above (see claim 12). Kao in view of Mitchell further discloses that said mechanism for designating selected ones of said nodes uses said likelihood score to designate said active nodes (Mitchell: column 2, lines 12-24, 'computing likelihood score for all active sub-word (herein equivalent to active node) models'; column 2, lines 12-24, 'there is change in the local best path which is based on the cumulative likelihood score of the phoneme sequence').

As per **claim 14**, Kao and Mitchell disclose everything claimed, as applied above (see claim 10). Kao in view of Mitchell further discloses the beam search algorithm (herein equivalently interpreted as traversal algorithm) for active portion of the phone network, including activating all valid phonemes, dynamic programming by using Viterbi algorithm, pruning unlikely phoneme sequences that have a lower cumulative likelihood score than a prescribed value (predetermined thresholds) (Mitchell: column 3, lines 52-65), which corresponds to the claimed "said traversal algorithm includes a dynamic programming process

that assigns a likelihood score to nodes that are traversed and wherein nodes are designated as active nodes if their likelihood score is above a predetermined threshold."

As per **claim 15**, Kao and Mitchell disclose everything claimed, as applied above (see claim 14). Kao in view of Mitchell further teaches a prescribed value relative to the current best cumulative score (herein equivalently interpreted as highest likelihood score) (Mitchell: column 3, lines 62-4), which corresponds to the claimed "said predetermined threshold is calculated based on the highest likelihood score."

As per **claim 16**, Kao and Mitchell disclose everything claimed, as applied above (see claim 10). Kao in view of Mitchell discloses a slot (note) structure for the search network (Kao: column 4, lines 7-20 and column 9, lines 10-18) that is capable of evaluating and linking active states (Kao: column 5, lines 1-7); an example of the expansion (herein interpreted as propagate) from phone to next phone (Kao: column 5, lines 11-19 and Fig. 4); and the list of "viable" phoneme sequences is updated and stored as a linked list (herein interpreted as active envelope) also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (Mitchell: column 4, lines 2-6) and the beam searching algorithm under the constraints (herein interpreted as a set of rules, including removing those phonemes that likelihood score lower than a prescribed value (Mitchell: column 3, lines 44-65); which corresponds to the claimed "said a mechanism for designating selected ones of said nodes as active nodes defines an active envelope and uses a set of rules to propagate the active envelope by removing nodes that have a likelihood score below a predetermined threshold."

13. Claims 2, 4 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao in view of Mitchell and further in view of well known prior art (MPEP 2144.03).

As per **claim 2**, Kao and Mitchell disclose everything claimed, as applied above (see claim 1). Kao in view of Mitchell fails to expressly disclose that the "said tree data structure is encoded in said memory as a flat representation in which nodes of each generation occupy contiguous memory locations". However, the examiner takes official notice that this feature was well known in the art, because conventional breath-firth traversal algorithm is generally used for storing nodes of each generation in contiguous memory location.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao in view of Mitchell by specifically providing a memory arrangement same as or similar to that of the conventional breath-firth traversal algorithm, for the purpose of increasing processing efficiency.

As per **claim 4**, Kao and Mitchell disclose everything claimed, as applied above (see claim 1). Kao in view of Mitchell further discloses a slot (node) using C (language) structure that has fields of indexes and pointers (Kao: column 4, lines 12-24), which are used for linking its parent and/or child, and also inherently used for indicia, such as slot_pointer = null or index_integer = 0 stands for a boundary, which corresponds to the claimed "the notes ... have indicia designating the topological boundary between children of the same parent". But Kao in view of Mitchell fails to expressly disclose that the "said tree data structure is encoded in said memory as a flat representation in which nodes of each generation occupy contiguous memory locations". However, the examiner takes official notice that this feature was well known in the

art, because conventional breath-firth traversal algorithm is generally used for storing nodes of each generation in contiguous memory location.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao in view of Mitchell by specifically providing a memory arrangement same as or similar to that of the conventional breath-firth traversal algorithm, for the purpose of increasing processing efficiency.

As per **claim 17**, Kao and Mitchell disclose everything claimed, as applied above (see claim 10). Kao in view of Mitchell further discloses a slot (note) structure for the search network (Kao: column 4, lines 7-20 and column 9, lines 10-18) that is capable of evaluating and linking active states (Kao: column 5, lines 1-7); an example of the expansion (herein interpreted as propagate) from phone to next phone (Kao: column 5, lines 11-19 and Fig. 4); and the list of "viable" phoneme sequences is updated and stored as a linked list (herein interpreted as active envelope) also known as the decoding tree, in which each node corresponds with a particular active phoneme of the phone network (Mitchell: column 4, lines 2-6) and the beam searching algorithm under the constraints (herein interpreted as a set of rules) (Mitchell: column 3, lines 44-65); which corresponds to the claimed "said a mechanism for designating selected ones of said nodes as active nodes defines an active envelope and uses a set of rules to propagate the active envelope". But, Kao in view of Mitchell fails to expressly disclose that the "mechanism uses a set of rules to propagate the active envelope *by inserting nodes* that have a likelihood score above a predetermined threshold". However, the examiner takes official notice that this feature was well known in the art, because inserting nodes on a linked list based structure is widely used in data structure design in computer applications, thus Kao in view of Mitchell is

capable of inserting node in a link list (Kao: column 6, lines 1-2, 'add at least one slot (node) to the search path, and Mitchell: column 3, lines 44-65, 'phoneme ... are removed'), without any difficulty.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao in view of Mitchell by specifically providing a mechanism for inserting nodes in an active node link list, for the purpose of implementing an alternative way for a link list in a search algorithm.

As per **claim 18**, Kao and Mitchell and well-known prior art disclose everything claimed, as applied above (see claim 17). Kao in view of Mitchell further discloses dynamic memory for building a searching tree by using RAM (Kao: column 1, lines 23-25); a slot (note) structure for the search network with fields of indexes and pointers (herein interpreted topological index, and inherently can be used for sorting), and execution requirements including grammar, timing and condition (herein interpreted as a set of rules) (Kao: column 4, lines 7-67 and column 9, lines 10-45), which suggests that the combined system is capable of implementing the functionality as claimed "said set of rules for inserting nodes guarantees that the nodes in said active envelope are sorted by their topological index."

As per **claim 19**, Kao and Mitchell disclose everything claimed, as applied above (see claim 1). Kao in view of Mitchell dose not expressly disclose that the "said processor employs a cache and wherein said wherein said tree data structure is encoded in said memory such that traversal of said tree proceeds into said cache". However, the examiner takes official notice that this feature was well known in the art, since caching technique for both hardware structure and software arrangement was widely used in signal processing art and computer related art.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Kao in view of Mitchell by specifically providing caching technique for both hardware structure and software arrangement, for the purpose of reducing processing time.

As per **claim 20**, Kao and Mitchell disclose everything claimed, as applied above (see claim 10). In addition, the rejection is based on the same reason described for claim 19 because claim 20 recites same or similar limitation(s) as claim 19.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any response to this office action should be mailed to:
Commissioner of Patents and Trademarks, P.O. Box 1450, Alexandria, VA22313-1450
or faxed to:
(703)-872-9314
Hand-delivered responses should be brought to:
Crystal Park II, 2121 Crystal Drive, Arlington. VA. Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qi Han whose telephone numbers is (703) 305-5631. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. and Friday from 8:00 a.m. to 12:00 a.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-6954.

Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

QH/qh
January 20, 2004